

REMARKS

Applicant's undersigned attorney thanks the Examiner for his comments. Applicant respectfully requests reconsideration of this patent application, particularly in view of the above Amendment and the following remarks.

Applicant's invention is a composition which includes a microbiological culture media for a naturally-derived dihydrolipoic acid (DHLA) compound. The DHLA is derived from an once-living source, i.e., at least one live DHLA-producing probiotic organism and is suitable for use in a medicament and/or nutritional supplement. The composition includes at least one DHLA-producing probiotic organism, R-lipoic acid, at least one nutritive agent, and, in certain embodiments, naturally-derived DHLA, an agent which inhibits probiotic activity, or a combination thereof.

Amendment to the Claims

Claims 4-22 and 24 are pending with Claim 13-19 withdrawn. Claims 4-12, 20-22, and 24 have been examined with no claims allowed.

Claim 4 has been amended to recite a composition including at least one probiotic organism, R-lipoic acid, at least one nutritive agent, naturally-derived dihydrolipoic acid, and an agent which halts probiotic activity. Support is found on page 6, lines 20-27.

Claims 5-10 have been amended to comport with the amendment to Claim 4 from which they depend.

Claim 12 has been amended to recited the composition comprises a microbiological culture media which includes the at least one probiotic organism, the R-lipoic acid, and turmeric rhizome powder.

Claims 13 and 16 have been amended to depend from Claim 12. Claim 13 has been further amended to recite that ethanol is added to the broth to halt the probiotic activity.

Claim 20 has been amended to recite that the composition of Claim 4 is used in a medicament or nutritional supplement.

Claim 21 has been amended to recite that the composition includes naturally-derived dihydrolipoic acid.

Claim 24 has been amended to recite a broth consisting essentially of at least one live dihydrolipoic acid-producing probiotic organism, R-lipoic acid, turmeric rhizome (*curcuma longa*) as a nutritive agent, and naturally-derived dihydrolipoic acid produced therein. Claim 24 has been amended to correct a typographical error in the spelling of “turmeric.”

New Claims 25-38 have been added.

New Claim 25 depends from original Claim 4 and recites that the naturally-derived dihydrolipoic acid is formed *in situ* from the R-lipoic acid. Support is found throughout the specification and, particularly, on page 1, lines 24-26; page 2, lines 4-8; and page 6, lines 20-25.

New Claim 26 depends from original Claim 4 and finds support on page 6, lines 25-27.

New Claim 27 is an independent claim and recites a composition including at least one dihydrolipoic acid-producing probiotic organism, R-lipoic acid, at least one nutritive agent, and naturally-derived dihydrolipoic acid. Support is found on page 6, lines 20-25.

New Claims 28 and 35 depend from Claim 27 and find support in original Claims 5-11.

New Claim 36 is an independent claim which recites a microbiological culture media comprising at least one live probiotic organism, R-lipoic acid, and at least one nutritive agent of which at least 50% by weight comprises turmeric rhizome. New Claims 37 and 38 depend from Claim 36. Claims 36-38 find support on page 6, lines 5-13.

No new matter has been added by this Amendment. Applicant is also submitting herewith any appropriate fees which may be owed for the number of claims which exceed the number originally paid for.

Claim Objections

Claim 24 has been objected to for having misspelled “harvestable.” Applicant submits that this objection has been obviated in view of the current amendment to Claim 24. Accordingly, reconsideration and withdrawal of this objection are respectfully requested.

Claim Rejections – 35 USC §112

Claims 4-12, 20-22, and 24 have been rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement for claiming new matter in the form of the limitation of a “harvestable quantity.” Applicant submits that this rejection has been obviated in view of the current amendments to Claims 4, 21, and 24. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

Claim Rejections – 35 USC §103**I. Hastings in view of Hermann**

The rejection of Claims 4-10 and 20-22 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,368,617 to Hastings et al. in view of Hermann et al (European Journal of Pharmaceutical Sciences, 1996) with additional support provided by Pyruvate Dehydrogenase & Krebs Cycle (1998) and Reed (JBC, 2001) is respectfully traversed.

A. Claim 4:

Applicant's invention as recited in amended Claim 4 is a composition including at least one probiotic organism, R-lipoic acid, at least one nutritive agent, naturally-derived dihydrolipoic acid, and an agent which halts probiotic activity. None of the references of record disclose or suggest such a combination.

Generally, as would be understood by a person of ordinary skill in the art, live microorganisms are included in dietary supplements in adequate amounts to confer a health benefit on the host. Indeed, Hastings discloses dietary supplements which include probiotic organisms for promoting healthy hormone balance and reducing the effects of aging in adult human subjects.

In particular, Hastings discloses that a probiotic blend of *Bifidobacterium bifidum* and *Lactobacillus acidophilus*, and the fructo-oligosaccharides, are included in dietary supplement to promote intestinal health by increasing and maintaining intestinal flora (Col. 4, line 66 – Col. 5, line 3). However, the presence of an agent which halts probiotic activity such as, for example, ethanol, would inhibit or prevent the probiotic organism from increasing or maintaining intestinal flora. Thus, there is no motivation for a person of ordinary skill in the art to modify the compositions disclosed in Hastings to include an agent which halts probiotic

activity because such a modification would render the probiotic organisms in the compositions of Hastings, alone or as modified by Hermann, unsuitable for their intended purpose, i.e., to reduce the effects of aging such as by promoting intestinal health of a host (Declaration, ¶ 8 and 9). Accordingly, Claim 4 as amended is not disclosed or suggested by Hastings in view of Hermann and supported by Reference A and/or Reed.

For at least the reasons above, Applicant respectfully submits that Hastings in view of Hermann further in view of Reference A and/or Reed does not disclose or suggest a composition including at least one probiotic organism and an agent which halts probiotic activity. Because Claims 5-10 and 20 depend from Claim 4, these claims are also patentable over Hastings in view of Hermann and further in view of Reference A and Reed. Accordingly, reconsideration and withdrawal of this rejection with respect to Claims 4-12 and 20 are respectfully requested.

B. Claims 4 and 21:

Applicant's invention as recited in amended Claims 4 and 21 requires that the composition include naturally-derived dihydrolipoic acid.

Hastings discloses a dietary supplement for promoting healthy hormone balance in adult human subjects. The dietary supplement can include, in addition to a secretagogue known as Symbiotropin in combination with 7-ketodehydroepiandrosterone (7-keto DHEA), alpha-lipoic acid and/or a probiotic blend of *Bifidobacterium bifidum* and *Lactobacillus acidophilus*. Hermann discloses that R(+)-enantiomer of alpha-lipoic acid has a greater absolute bioavailability than the S(-)-enantiomer of alpha-lipoic acid when consumed by a human. Neither Hastings nor Hermann disclose or suggest a composition including, in addition to the probiotic organism(s), R-lipoic acid, and the nutritive agent(s), naturally-derived dihydrolipoic acid.

The "Pyruvate Dehydrogenase & Krebs Cycle" article (hereinafter "Reference A") and Reed et al., do not overcome the deficiencies of Hastings and Hermann in that neither reference discloses or suggests a composition including, in addition to the probiotic organism(s), R-lipoic acid, and the nutritive agent(s), naturally-derived dihydrolipoic acid.

Reference A discloses that lipoic acid can be reduced to dihydrolipoic acid that can in turn be oxidized to lipoic acid as part of the Krebs Cycle. This reference does not disclose or suggest producing naturally-derived dihydrolipoic acid but rather demonstrates the cyclic activity of the Krebs Cycle wherein the lipoic acid is conserved; i.e., no new matter is produced.

Reed discloses using lipoic acid and dihydrolipoic acid in substrate amounts to show that extracts of aerobically grown *E. coli* contain lipoyl transacetylase and lipoyl dehydrogenase. Reed does not disclose or suggest that using lipoic acid in connection with a probiotic organism (it is noted that *E. coli* is not generally classified as a probiotic organism) and a nutritive agent produces naturally-derived DHLA.

As Applicant notes on page 1, line 24 – page 2, line 3, lipoic acid and dihydrolipoic acid are naturally synthesized by living organisms at the cellular level. However, cells generally only produce an amount of DHLA sufficient for metabolic function (i.e., for use in the Krebs Cycle). Thus, neither Reference A nor Reed add anything to Hastings in Hermann which would lead one of skill in the art to prepare a composition including, in addition to the probiotic organism(s), R-lipoic acid, and the nutritive agent(s), naturally-derived dihydrolipoic acid.

For at least the reasons above, Applicant respectfully submits that Hastings in view of Hermann further in view of Reference A and/or Reed does not disclose or suggest a composition including at least one probiotic organism, R-lipoic acid, and at least one nutritive agent, and naturally-derived dihydrolipoic acid. Because Claims 5-10 and 20 depend from Claim 4 and Claim 22 depends from Claim 21, these claims are also patentable over Hastings in view of Hermann and further in view of Reference A and Reed. Accordingly, reconsideration and withdrawal of this rejection as applied to Claims 4 and 21 are respectfully requested.

II. Hastings in view of Hermann and further in view of Reddy

The rejection of Claims 11, 12 and 24 under 35 U.S.C. § 103(a) as unpatentable over Hastings in view of Hermann and further in view of U.S. Patent 6,080,401 to Reddy et al. is respectfully traversed.

A. Claims 11 and 12:

As discussed above, Hastings, alone or as modified by Hermann, does not disclose or suggest a composition including both probiotic organisms and an agent which halts probiotic activity. Thus, Claim 4, from which Claims 11 and 12 depend, is believed to be patentable.

Reddy does not overcome the deficiencies of Hastings in view of Hermann, but further teaches away from the composition recited in amended Claim 4. Specifically, Reddy requires that the compositions disclosed therein include viable probiotic organisms and that such compositions be free of substances which are substantially inhibitory to the viability of the probiotic organisms for it is the activity of the probiotic organisms that enhances the efficacy of the drug with which it is combined (see, e.g., Col. 6, lines 30-33). Thus, Reddy teaches away from the combination of a probiotic organism, R-lipoic acid, turmeric rhizome, and an agent which inhibits probiotic activity as recited in Claim 4.

For at least these reasons, Applicant respectfully submits that Claims 11 and 12 are patentable over Hastings in view of Hermann and further in view Reddy. Accordingly, reconsideration and withdrawal of this rejection as applied to Claims 11 and 12 are respectfully requested.

B. Claims 11, 12, and 24:

As discussed above, Hastings in view of Hermann also does not disclose or suggest a composition including, in addition to the probiotic organism(s), R-lipoic acid, and the nutritive agent(s), naturally-derived dihydrolipoic acid. Thus, Claim 4 is believed to be patentable over Hastings in view of Hermann.

Although Reddy discloses drugs containing a combination of beneficial micro-organisms, such as probiotic organisms, with drugs of herbal origin, such as *curcuma longa*, for the treatment of a disease or disorder in humans or animals, Reddy does not disclose or suggest a composition including, in addition to the probiotic organism(s), R-lipoic acid, and the nutritive agent(s), naturally-derived dihydrolipoic acid.

For at least these reasons, Applicant respectfully submits that Claims 11, 12, and 24 are patentable over Hastings in view of Hermann and further in view Reddy. Accordingly,

reconsideration and withdrawal of this rejection as applied to Claims 11, 12, and 24 are respectfully requested

C. Claim 24:

Further, with regard to Claim 24, the recited composition consists essentially of at least one probiotic organism, R-lipoic acid, water, turmeric rhizome as a nutritive agent, and naturally-derived dihydrolipoic acid produced by the broth. Accordingly, the presence of additional nutritive agents such as, for example, omega-3 fatty acids and saccharides of Hastings or the dry milk powder which is used in the preparation of the probiotics for the formulations disclosed in Reddy (*see*, Reddy, Col. 11, lines 10-16 and lines 59-65), is precluded.

For at least the reason above, Claim 24 is patentable over Hastings in view of Hermann and further in view of Reddy. Accordingly, reconsideration and withdrawal of this rejection as applied to Claim 24 are respectfully requested.

New Claims

I. Claims 27-35

Applicant has added herein new Claims 27-35 which are also believed to be patentable over Hastings, Hermann, Reference A, Reed, and/or Reddy.

Applicant's invention as recited in new Claim 27 requires that the composition include naturally-derived dihydrolipoic acid.

As discussed above in connection with Claims 4, 11, 12, 21 and 24, none of Hastings, Hermann, Reference A, Reed, and Reddy, alone or in combination disclose or suggest a composition comprising in addition to the probiotic organism(s), R-lipoic acid, and the nutritive agent(s), naturally-derived dihydrolipoic acid.

Further, both Hastings and Reddy rely on the activity of the probiotic organisms in their compositions to provide a beneficial therapeutic effect to a person consuming the composition (See, Hastings Col. 4, line 66 – Col. 5, line 3; Reddy Col. 6, lines 30-33; and the Declaration, ¶ 8). Generally, one of ordinary skill in the art would recognize that supplements containing live probiotic organisms are active at temperatures at or above room temperature (i.e., about 20°C to about 25°C) and will grow provided a food supply is present. However, once such a food supply is exhausted cell death occurs. (See, Declaration, ¶ 11). Further, as is well known

in the art, dietary supplements containing live probiotic organisms are handled and stored at temperatures below about 20°C in order to preserve the activity of the probiotic organisms (Declaration, ¶ 12). Additionally, optimum growth temperatures for most probiotic organisms fall in a range between 37°C and 43°C with little or no growth observed for most *Bifidobacterium* and *Lactobacillus* species below 20°C and above 46°C (Declaration, ¶ 13). Applicant has found, however, that the activity of probiotic organisms in a microbiological including at least one nutritive agent is diminished at room temperature (Declaration, ¶ 14).

In view of the above, Applicant submits that the compositions of either Hastings in view of Hermann or Hastings in view of Hermann and further in view of Reddy would not produce appreciable amounts of naturally-derived DHLA absent incubation at or near the optimum growth temperature of the probiotic organisms. Additionally, in view of the need to preserve the number and the activity of the live probiotic organisms in the compositions in order to deliver a beneficial therapeutic effect to a host, one of ordinary skill in the art would not be motivated to expose such compositions to excessive heat in order to produce naturally-derived dihydrolipoic acid therein.

For at least the reasons above, Applicant respectfully submits that Hastings in view of Hermann further in view of Reference A and/or Reed does not disclose or suggest a composition including, in addition to the probiotic organism(s), R-lipoic acid, and the nutritive agent(s), naturally-derived dihydrolipoic acid. In view of the above, Applicant respectfully submits that new Claim 27 and dependent Claims 28-35 are patentable over the art or record.

II. New Claims 36-38

Applicant has added herein new Claims 36-38 which are also believed to be patentable over Hastings, Hermann, Reference A, Reed, and/or Reddy.

Applicant's invention as recited in new Claim 36 recites a microbiological culture media for producing a naturally-derived dihydrolipoic acid which includes at least one live dihydrolipoic acid-producing probiotic organism, R-lipoic acid, and at least one nutritive agent wherein turmeric rhizome comprise at least 50% by weight of the total weight of nutritive agents present in the microbiological media.

The Office Action states that it would have been obvious to a person of having ordinary skill in the art to add the turmeric rhizome (*Curcuma longa*) ingredient disclosed in Reddy to the composition of Hastings for the purpose of further addressing to goal of assisting in weight loss and diet. However, has such a combination been made, the resulting composition would have included more than one nutritive agent of which the turmeric rhizome would only contribute a small percentage by weight.

For example, the Office Action states that the embodiments disclosed by Hastings with support from Hermann include each of the ingredient types recited in Claim 4 and identifies omega-3 fatty acids and saccharides as nutritive agents. Hastings discloses that the omega-3-fatty acids and saccharides are to be provided in ranges of 75 to 235 mg and 250 to 740 mg, respectively (Col. 5, lines 19-24). Additionally, the only embodiments disclosed in Hastings that includes probiotic organisms, R-lipoic acid, and a nutritive agent are in the form of a dry powder to be mixed with an aqueous fluid. Hastings further teaches that, in dry powder form, the compositions include flavoring agents and agents that promote processing and increase solubility, resulting in a daily serving size that ranges from 10 g to 30 g (Col. 3, lines 13-21). The examples provided in Hastings include 7,227 mg of the polysaccharide maltodextrin (Col. 6, line 13 and line 38).

The compositions disclosed in Hastings “may also include a herbal blend composed of herbs having properties identified with anti-aging” (Col. 5, lines 25-27). If such herbs are used, each herbal ingredient “may be present in the general range of about 18 to 60 mg” (Col. 5, lines 55-60). Hastings also discloses a group of seven herbal ingredients (Col. 5, lines 25-55) with no suggestion to omit any of the identified herbal ingredients from the blend. The maximum daily dose of turmeric rhizome disclosed in Reddy for any purpose is 240 mg, though the stated preferred range would total 120-180 mg (quantity per capsule in Table 5; instruction that capsules are to be taken three times daily) (Reddy, Col. 19, lines 17-18).

Accordingly, it is submitted that there is no motivation or suggestion to combine Hastings and Hermann in view of Reddy to produce a composition in which turmeric rhizome could serve as either the sole or the predominant nutritive agent as recited in new Claims 36-38.

For at least this reason, new Claims 36-38 are believed to be patentable over the references of record.

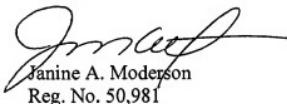
Copy of Claims of Copending U.S. Applications

A copy of the current claims of copending U.S. Patent Application Serial No. 11/028,272 is appended to this Response.

Conclusion

Applicant believes that the application is now in condition for allowance. If the Examiner feels that any issues remain regarding this application, then Applicant's undersigned attorney respectfully requests a telephone interview with the Examiner to discuss these issues. The undersigned can be reached at (312) 327-3327.

Respectfully submitted,



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Claims of Co-pending U.S. Patent Application Serial No. 11/028,272

1. A process for naturally deriving a beneficial compound comprising:
preparing a microbiological culture comprising at least one live *Bifidobacterium* species, at least one additional live probiotic organism, and at least one of a nutritive agent, a nutraceutical agent, or a combination thereof;
incubating the microbiological culture to initiate probiotic activity;
halting the probiotic activity;
harvesting a waste byproduct of the probiotic activity; and
separating the beneficial compound from the waste byproduct.
2. The process of claim 1 wherein the at least one additional live probiotic organism is selected from the group consisting of *Lactobacillus* species, *Bifidobacterium* species, *Enterococcus* species, *Streptococcus thermophilus*, and combinations thereof.
3. The process of claim 1 wherein the microbiological culture is incubated at a temperature of from about 35°C to about 40°C.
4. The process of claim 1 wherein the microbiological culture is incubated for a period of from about 24 hours to about 240 hours.
5. The process of claim 1 wherein the probiotic activity is halted by adding organic ethanol.

6. (Withdrawn) The process of claim 1 wherein:

the at least one additional live probiotic organism is selected from the group consisting of *Lactobacillus* species, *Bifidobacterium* species, *Enterococcus* species, *Streptococcus thermophilus*, and combinations thereof,

the microbiological culture includes at least one nutritive agent and at least one nutraceutical agent which is a source of a B vitamin; and

the beneficial compound comprises at least one B vitamin coenzyme.

7. (Withdrawn) The process of claim 6 wherein the nutritive agent comprises at least one species of nutritional yeast.

8. (Withdrawn) The process of claim 6 wherein the nutritive agent comprises *Saccharomyces cerevisiae*.

9. (Withdrawn) The process of claim 6 wherein the at least one naturally derived B vitamin coenzyme is selected from the group consisting of 5-methyltetrahydofolate, 5-deoxyadenosylcobalamin, pyridoxal-5-phosphate, coenzyme A, inositol hexanicotinamide, riboflavin-5-phosphate, thiamin cocarboxylase, inositol, choline, biotin and combinations thereof.

10. (Withdrawn) The process of claim 6 wherein the microbiological culture is incubated for a period of from about 96 hours to about 240 hours.

11. (Withdrawn) The process of claim 1 wherein:

the at least one additional live probiotic organism selected from the group consisting of *Lactobacillus* species, *Bifidobacterium* species, *Enterococcus* species, *Streptococcus thermophilus*, and combinations thereof, and

the microbiological culture includes at least one nutraceutical agent.

12. (Withdrawn) The process of claim 11 wherein the naturally derived beneficial compound comprises at least one polyphenol compound.

13. (Withdrawn) The process of claim 12 wherein the nutraceutical agent comprises a material selected from the group consisting of green tea in whole, chopped or powdered form, at least one polyphenol concentrate, and combinations thereof.

14. (Withdrawn) The process of claim 12 wherein the at least one polyphenol compound is selected from the group consisting of epigallocatechin-3-gallate, epigallocatechin, epicatechin-3-gallate, epicatechin, catechin-3-galate, catechin and combinations thereof.

15. (Withdrawn) The process of claim 12 wherein the microbiological culture is incubated for a period of from about 96 hours to about 144 hours.

16. (Withdrawn) The process of claim 11 wherein the naturally derived beneficial compound is UVI-quinol.

17. (Withdrawn) The process of claim 16 wherein the nutraceutical agent comprises UVI-quinone.

18. (Withdrawn) The process of claim 16 wherein the microbiological culture further comprises at least one nutritive agent.

19. (Withdrawn – currently amended) The process of claim 18 wherein the at least one nutritive agent comprises turmeric tumeric rhizome.

20. (Withdrawn) The process of claim 16 wherein microbiological culture is incubated for a period of from about 168 hours to about 196 hours.